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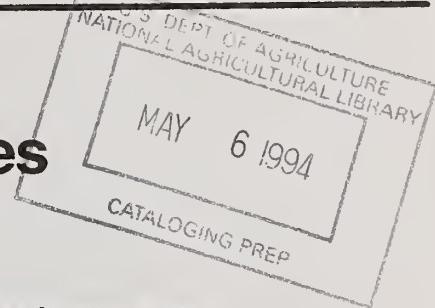
COOPERATIVE FORESTRY

Technology Update

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Hardwood Log Grades

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INTRODUCTION

An important part of the buying and selling of any product is an understanding of the characteristics of the product that contribute to its value. Value directly influences the dollar amount we are willing to pay or require in order to complete a sales transaction. A buyer never wants to pay more than an item's value, and a seller never wants to receive less. The problem in the sales process often comes in assigning an agreed-upon value to the product. This can be particularly troublesome when the product in question is one with all the uniqueness and natural variability of a hardwood log. Since the objective of grade sawing is to obtain the highest possible grade of lumber from a given log, a log grading system that helps to estimate the yield of upper grade lumber can be useful in determining the value of roundwood.

WHY GRADE LOGS?

A log is graded to determine its value. This value is based on the quantity and quality of lumber that it will yield. The USDA Forest Service has developed a hardwood log grading system that divides sawlogs into three grades. The specifications for these log grades are closely correlated with the clear-face cutting specifications for standard hardwood lumber grades. Log grades, when properly applied, will give a distinct 20 percent value separation between the three grades. As a rule of thumb, Grade No. 1 logs yield 60+ percent 1 common and better grade lumber; Grade No. 2 logs yield 40 to 60 percent 1 common and better lumber; and Grade No. 3 logs yield 20 to 40 percent 1 common and better lumber. Having determined the grade of a log, a grader can consult a current lumber price report, subtract overhead costs, and arrive at a value for the log.

GRADING HARDWOOD LOGS

Grading hardwood logs is not difficult. But it does require knowledge of defect indicators and close scrutiny to make sure no defects are overlooked. The term "defect" is defined as "any irregularity or imperfection in a log that reduces the volume of sound wood or lowers its durability, strength, or utility values." The fewer the number of defects in a log, the higher the quality of lumber that can be sawn from it—and, consequently, the higher the grade of the log. Defects fall into two main categories: (1) scalable defects—those that reduce the volume of sound wood or lower its durability; and (2) grade defects—those that lower its strength or take away from its appearance. See table 1.

Hardwood log grading is a four-step process:

Step 1 — Measurement of Log Diameter and Length: The average diameter inside the bark on the small end of the log is used in scaling and grading. The length for figuring the necessary clear cuttings is dropped to the nearest full foot, but cuttings are allowed to include the overlength.

Step 2 — Faces: Visually square the log into four faces oriented in such a way as to give the largest possible number of good faces. Confine any given defect to one grading face wherever possible. The grade of the log will be established by the poorest face of the best three faces. In other words, disregard the poorest face on the log and grade the poorest of the remaining three faces. See figure 1.

Step 3 — Clear Cuttings: The grade of a face is established on the basis of clear cutting requirements. Clear cuttings are portions of the length of a face that lie between defects or between the ends of the log and defects. All cuttings must be clear and extend the full width of the face. The major problem in grading logs is to locate the cuttings. This requires the proper evaluation of surface indicators of defects. Branch stubs and knot over-growths are clearly evident, so they present no problem. But a grader usually needs some training and experience to detect and evaluate accurately other less obvious indicators.

Step 4 — End Features: Once the faces have been graded, the log ends must be examined for grade defect indicators that may not show on the log surfaces. These are provided for by special instructions for evaluating end defects and by the general restriction on the percentage of scaling deduction allowed in each grade.

REFERENCES

The preceding discussion of hardwood log grades is intended strictly as an introduction to the subject. Anyone interested in this method of grading will need to do further reading. The following publications are suggested for a more in-depth discussion of this subject.

Carpenter, Roswell D.; Sonderman, David L.; Rast, Everette D.; 1989. Defects in hardwood timber. Agric. Handb. No. 678. Washington: U.S. Department of Agriculture. 88 p.



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Rast, Everette D.; Sonderman, David L.; Gammon, Glenn L.; 1973. A guide to hardwood log grading. General Technical Report NE-1. Upper Darby, PA: USDA Forest Service, Northeastern Forest Experiment Station. 31 p.

Both of these publications are available from the Northeast Experiment Station. For copies, call or write to:

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Figure 1.—Selecting the grading face.

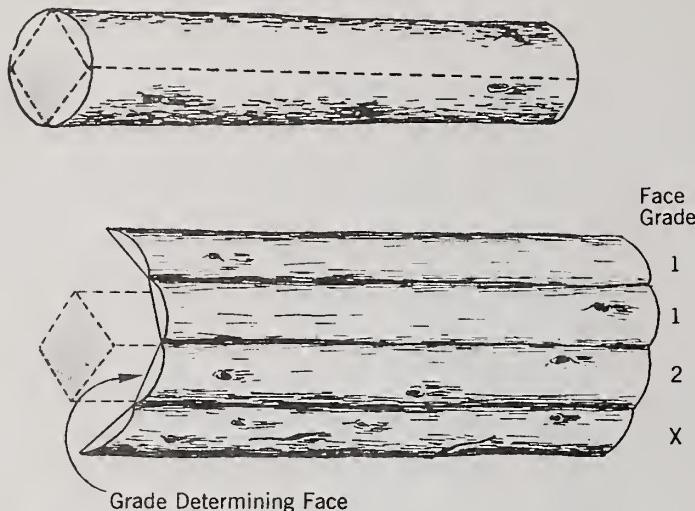


Table 1.—Forest Service standard grades for hardwood factory lumber logs.

Grading Factors		Log Grades							
		F1			F2			F3	
Position in tree		Butts only	Butts & uppers		Butts & uppers			Butts & uppers	
Diameter, scaling		1 13"-15"	16"-19"		20" +	2 11"	12" +		8" +
Length without trim		10' +			10'+	8-9'	10-11'	12' +	8' +
Clear cuttings ³ on each 3 best faces	Length, min.,	7'	5'	3'	3'	3'	3'	3'	2'
	Number, maximum	2	2	2	2	2	2	3	No limit
	Fraction of log length required in clear cutting ⁴	5/6	5/6	5/6	2/3	3/4	2/3	2/3	1/2
Sweep and crook allowance (maximum) in percent gross volume	For logs with less than 1/4 of end in sound defects	15%			30%			50%	
	For logs with more than 1/4 of end in sound defects	10%			20%			35%	
Total scaling deduction including sweep and crook		⁵ 40%			⁶ 50%			50%	
End defects:									

¹ Ash and basswood butts can be 12 inches if they meet all other No. 1 requirements. ² Ten-inch logs of all species can be No. 2 if they meet all other No. 1 requirements. ³ A clear cutting is a portion of a face free of defects, extending the width of the face. ⁴ See Table No. 1. ⁵ Otherwise No. 1 logs with 41-60% deductions can be No. 2. ⁶ Otherwise No. 2 logs with 51-60% deductions can be No. 3.